



Research article

Policy efficiency in the field of food sustainability. The adjusted food agriculture and nutrition index



Massimiliano Agovino*, Massimiliano Cerciello, Andrea Gatto

Department of Economic & Legal Studies, University of Naples Parthenope, Room 510, Palazzo Pacanowski, Via Generale Parisi, 13 80132, Napoli, Italy

ARTICLE INFO

Article history:

Received 27 July 2017
 Received in revised form
 29 March 2018
 Accepted 12 April 2018

Keywords:

Food sustainability
 Policy efficiency
 Composite indicators
 Data Envelopment Analysis

ABSTRACT

This work introduces a revised version of the *Food Sustainability Index*, proposed by the Economist Intelligence Unit and the Barilla Center for Food and Nutrition in 2016. Our *Adjusted Food Sustainability Index* features two important advantages: 1) it employs the Mazziotta-Pareto method to compute weights, hence granting an objective aggregation criterion and 2) it does not take policy variables into account, thus focusing on the *status quo*. The policy variables are aggregated into the *Policy Index*, measuring the quality of the food sustainability policies. We compute the two indices for 25 countries worldwide, then we use the Data Envelopment Analysis to evaluate policy efficiency. Our results show that country-level variation in policy efficiency is wide and policies affect food sustainability significantly, especially when they target nutritional challenges.

© 2018 Elsevier Ltd. All rights reserved.

1. Introduction

The interrelation between food, agriculture and nutrition is a paramount factor when it comes to addressing the challenges of sustainable development (Canavan et al., 2016). In developing countries, rural poverty generates food insecurity, which translates into both undernourishment and obesity (Tanumihardjo et al., 2007). Hunger is at present accompanied by overproduction of food: while 1.4 billion people live in absolute poverty, about one third of the food produced for human consumption ends up being lost or wasted (Gustavsson et al., 2011; Buzby and Hyman, 2012; Briganti and Gatto, 2015). Not all of the food produced worldwide is meant for human consumption however, despite about one seventh of the world's population fights hunger on a daily basis (Collier, 2008). Foreign firms in developing countries often find it more profitable to divert the use of land towards biofuels and/or animal feeding (Briganti and Gatto, 2015; Liberti, 2013). These concerns were recently summed up into three food paradoxes: i) starvation/obesity; ii) food need/food destination (people, animals

or vehicles); and iii) food waste/food insecurity (BCFN, 2010; FAO, 2017; EIU, 2016).¹

Concerning the policy response to such issues, tangible progress was made in the recent years: while in 1990 the UN *Millennium Development Goals* (MDGs) vaguely prescribed the eradication of poverty and hunger, the *Sustainable Development Goals* (SDGs) and the 2030 Agenda of September 2015 targeted more directly food sustainability (EIU, 2016).² The development goals stimulated the production of composite indicators measuring food-related issues, which are by their own nature multidimensional (Lang and Barling, 2012). Many attempts have been made to get a sufficiently clear picture of the food sustainability state-of-the-art (Sands and

¹ The theoretical literature has sketched out two key concepts related to food and development: food security, meant as the availability of sufficient, safe and affordable food (Pinstrup-Andersen, 2009) and food sustainability, more broadly defined as the long-term intergenerational viability of the food system, in economic, social, environmental and institutional terms. These two concepts are strictly intertwined and crucial within the current food policy debate and agenda (Lang and Barling, 2012).

² The SDGs aim to: i) 'end hunger, achieve food security and improved nutrition and promote sustainable agriculture' (SDG 2); ii) 'ensure healthy lives and promote well-being for all, at all ages' (SDG 3); iii) 'reduce inequalities' (SDG 10); iv) 'ensure sustainable consumption and production patterns' (SDG 12); v) 'take urgent action to combat climate change and its impacts' (SDG 13); and vi) 'protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss' (SDG 15).

* Corresponding author. Department of Economic & Legal Studies, University of Naples Parthenope, Room 507C, Palazzo Pacanowski, Via Generale Parisi, 13, 80132, Napoli, Italy.

E-mail addresses: agovino.massimo@gmail.com, massimiliano.agovino@uniparthenope.it (M. Agovino), massimiliano.cerciello@uniparthenope.it (M. Cerciello), andrea.gatto@uniparthenope.it (A. Gatto).

Podmore, 2000; Ekins et al., 2003; Zhen and Routray, 2003; Gómez-Limón and Sanchez-Fernandez, 2010).

The indicators produced are not equivalent and convey information on food sustainability from different angles (Santeramo, 2015a; Dahl, 2012). Most of them focus on one single perspective, capturing objective information (health, diets, etc.), experiential dimensions (Vaitla et al., 2015; Barrett, 2010), or household level perception (Cafiero et al., 2014). Other works tackle food security as a multidimensional issue (Ike et al., 2017; Maxwell et al., 1999; EIU, 2016), clearing the path for our contribution.

A recent joint work by BCFN and EIU (EIU, 2016) proposed the **Food Sustainability Index (FSI)**, which met with a certain degree of popularity. Such synthetic index, aggregating 55 variables, aims to take into account the economic, social, and environmental dimensions of food sustainability. The index was computed for 25 highly heterogeneous OECD and non-OECD countries. It is composed by three pillars: A) Food Loss and Waste, B) Sustainable Agriculture, and C) Nutritional Challenges. Each of the three pillars is meant to capture one of the dimensions of food sustainability, in line with the food paradoxes outlined in the international agenda. The FSI offers a comprehensive and multidimensional picture for a somewhat representative set of countries, at different development stages. Nonetheless, it received criticism over both the aggregation method and the qualitative judgements assigned to policies and public initiatives (Jank, 2017). Aggregating quantitative values with qualitative assessments on the effectiveness of policies is in general a questionable procedure. Moreover, the FSI fails to disentangle the role of national policies and to isolate them from the *status quo*. Its main limit however is the subjective weighting system.

Overall the FSI is a valuable attempt to overcome the opacity of the current framework on food sustainability, yet it remains an explorative proposal. We attempt to improve it, in both theoretical and methodological terms, without altering its main structure.

To sort out the methodological fragility of the FSI, we implement in the first step of our analysis a different aggregation method that does not allow for full-substitutability among components, namely the Mazziotta-Pareto method, that yields the remarkable advantage of an objective weighting procedure. To address the theoretical concerns instead, we remove the policy variables, thus focusing only on the current situation. In the second step of our analysis, we investigate the impact of the policy variables – which we aggregate into the brand-new Policy Index (PI) – on food sustainability. Moreover, we assess policy efficiency using the Data Envelopment Analysis (DEA). This way, we get an idea of the determinants of policy efficiency across countries.

The rest of this paper proceeds as follows: Section 2 provides an overview of the existing literature on food sustainability and introduces the FSI, proposed jointly by the Economist Intelligence Unit and the Barilla Center for Food and Nutrition. Section 3 shows how we define our Adjusted Food Sustainability Index (AFSI), illustrates its pillars and subsequently introduces the Mazziotta-Pareto procedure and DEA. Section 4 presents our dataset and highlights the relevance of the variables we use. Section 5 illustrates our results, providing an AFSI-based country ranking, and displays DEA results. Section 6 discusses the results, showing some relevant policy implications, while Section 7 offers our concluding remarks.

2. Background literature

Composite indicators aggregate different variables into one single measure. Following EIU-BCFN's FSI, we combine variables into sub-pillars and subsequently sub-pillars into pillars. Food waste, agricultural sustainability and nutritional effectiveness are the three pillars of the FSI, as well as the key points on the development

agendas of both international organisations and national governments (WHO, 2014; FAO, 2015). Following the previous literature (Garnett, 2011, 2013; Garnett et al., 2013; Godfray et al., 2010; EIU, 2016), we focus on these three dimensions to construct the AFSI.

2.1. Food waste

Food waste generates significant costs related to the collection and disposal of leftovers (Morone et al., 2016), calling for food waste reduction strategies as one of the main societal challenges to be tackled in the 21st century (Giroto et al., 2015). These strategies have become a priority in the international policy agenda (Priefer et al., 2016). In order to be effective, food waste reduction strategies must tackle both sides of the market: producers and retailers on the supply side, consumers on the demand side. Consumer behaviours are of vital importance, not only for purchasing decisions, but also because they influence the industry standards (Aschemann-Witzel, 2015). Unfortunately, consumers do not always behave rationally: consumers have consistently been shown to over-purchase, to fail to read labels accurately and to be very sensible to special discounts and packaging, often generating more food waste than they intend and perceive. Governmental actions tackling these points may make a big difference.

2.2. Agricultural sustainability

In 2017 about 1.4 billion people lived on less than 1.25 USD a day, while one billion suffered from hunger (Collier, 2008). Food crises are still all but rare, as a result of food price volatility and spikes, that hit especially the poor – either farmers or consumers – living in developing countries (Savastano et al., 2012; Swinnen, 2010). Food demand is expected to increase sharply – according to IFAD, it will rise by 60–70% within 2050 (IFAD, 2011). Price imbalances in the food markets may affect the relation between agriculture and work, causing a drop in the working standards. *Contract farming* has introduced structural manpower insecurity, while *land grabbing* – i.e. the acquisition by foreign firms of vast extents of land in developing countries – has diverted the use of land from human-oriented production (Von Braun and Meinzen-Dick, 2009; Liberti, 2013). The overall agricultural production, accounts for 10–15% of the greenhouse gas emissions of the planet, contributing significantly to climate change (Tilman et al., 2011). To address such concerns, sustainable development strategies have increasingly targeted not only agriculture and harvesting, but also the non-farming rural economy. The international consensus has shifted in the last years from the market-boosting approach, to the broader concept of social inclusion, embedding practices in favour of poverty reduction and gender equality (WB, 2009). Poverty affects 70% of the rural population in the world, which in turn represents 55% of the global population (IFAD, 2011), while gender inequality is substantial, determining the relegation of women to marginal roles (Donovan et al., 2015). Poverty reduction and gender empowerment have become a focus in the strategy advocated by the SDGs.

2.3. Nutritional effectiveness

Perhaps the most striking of the food paradoxes (see Section 1) is the parallel existence of obesity and malnourishment, very common in developing countries. Obesity rates are increasing in low and middle-income countries, especially among children (Popkin et al., 2012; Caballero, 2005). Obesity increases the incidence of related diseases, like diabetes, cardiovascular problems and cancer (Tanumihardjo et al., 2007; Caballero, 2005). Developing countries currently lack the public resources to fight contemporarily hunger and quickly spreading diseases. Policy options to tackle obesity

Download English Version:

<https://daneshyari.com/en/article/7476942>

Download Persian Version:

<https://daneshyari.com/article/7476942>

[Daneshyari.com](https://daneshyari.com)